

## BAB VII

### PERHITUNGAN SAMBUNGAN BALOK B1 DENGAN KOLOM K

#### 7.1 Sambungan Balok B1 dengan Kolom K

##### Output Gaya Maksimum pada Sambungan hasil SAP

$$M_u := 366.69 \text{ kgm}$$

$$P_u := 748.25 \text{ kg}$$

Direncanakan baut HTB  $\phi 16$  BJ 41

$$f_{ub} := 4100 \text{ kg/cm}^2$$

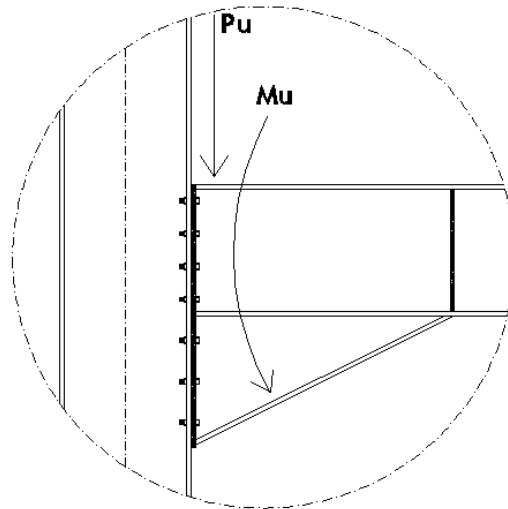
$$\Phi_{\text{baut}} := 16 \text{ mm}$$

$$A_b := \frac{\pi}{4} \cdot 1.6^2 = 2.011 \text{ cm}^2$$

Pelat penyambung BJ 37

$$f_u := 3700 \text{ kg/cm}^2 \quad t_p := 10 \text{ mm}$$

$$f_y := 2400 \text{ kg/cm}^2$$



- Kontrol Geser

Direncanakan baut HTB 8  $\phi 16$

$$V_u := \frac{P_u}{8} = 93.531 \text{ kg}$$

$$f_{uv} := \frac{V_u}{A_b} = 46.519 \text{ kg/cm}^2 \quad \blacksquare \leq \blacksquare \quad 0.5 \cdot 0.75 \cdot f_{ub} \cdot 1 = 1537.5 \text{ kg/cm}^2 \quad \text{OK!!}$$

- Beban Tarik ( interaksi geser dan tarik )

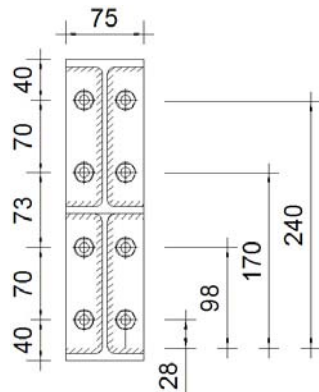
$$f_t := (1.3 \cdot f_{ub} - 1.0 \cdot f_{uv}) = 5283.481 \text{ kg/cm}^2 \quad \blacksquare \geq \blacksquare \quad f_{ub} = 4100 \text{ kg/cm}^2$$

$$f_t := f_{ub} = 4100 \text{ kg/cm}^2$$

$$T_d := 0.75 \cdot f_{ub} \cdot A_b = 6182.654 \text{ kg}$$

Mencari garis netral ----> anggap dibawah baut terbawah

$$a := \frac{8 \cdot T_d}{7.5 \cdot 2400} = 2.75 \text{ cm} \quad \blacksquare \leq \blacksquare \quad 4 \text{ cm} \quad \text{OK!!}$$



Momen rencana yang dapat dipikul sambungan

$$\Phi M_n := \frac{\left[ \left( 0.9 \cdot 2400 \cdot a^2 \cdot \frac{7.5}{2} \right) + 2 \cdot T_d \cdot (2.8 + 9.8 + 17 + 24) \right]}{100} = 7239.409 \text{ kgm}$$

$$\Phi M_n = 7239.409 \text{ kgm} \quad \blacksquare \geq \blacksquare \quad M_u = 366.69 \text{ kgm}$$

- **Sambungan Pelat dengan Balok ( Sambungan Las )**

Digunakan las F<sub>E70XX</sub>

Tebal las  $t_e := 1 \text{ cm}$

Profil balok B1 WF 150 x 75 x 5 x 7 BJ 37

$$h := 150 - 2 \cdot (7 + 8) = 120 \text{ mm}$$

$$\text{Alas} := 2 \cdot (12 + 7.5) \cdot 1 = 39 \text{ cm}^2$$

$$I_p := 2 \cdot \left[ \left( \frac{1}{12} \cdot 12^3 \right) + \left[ 1 \cdot 39 \cdot \left( \frac{7.5}{2} \right)^2 \right] \right] = 1384.875 \text{ cm}^4$$

**Akibat beban geser sentris**

$$P_u = 748.25 \text{ kg}$$

$$f_u := \frac{P_u}{\text{Alas}} = 19.186 \text{ kg/cm}^2$$

**Akibat beban momen lentur**

$$M_u = 366.69 \text{ kgm}$$

$$S_x := \frac{I_p}{7.5} = 184.65 \text{ cm}^3$$

$$f_h := \frac{M_u \cdot 100}{S_x} = 198.587 \frac{\text{kg}}{\text{cm}^2}$$

$$f_{\text{tot}} := \sqrt{f_u^2 + f_h^2} = 199.511 \frac{\text{kg}}{\text{cm}^2}$$

**Kekuatan rencana las**

$$\Phi f_n := (0.75 \cdot 0.6 \cdot 70 \cdot 70.3) = 2214.45 \frac{\text{kg}}{\text{cm}^2}$$

$$f_{\text{total}} < \Phi f_n$$

$$\text{teperlu} \geq \frac{f_{\text{tot}}}{\Phi f_n} = 0.09 \text{ cm}$$

$$\text{aperlu} \geq \frac{0.09}{0.707} = 0.127 \text{ cm}$$

Syarat :

$$a_{\text{min}} := 4 \text{ mm} \quad (t = 10 \text{ mm})$$

$$a_{effmax} := 0.707 \cdot \frac{3700 \cdot 0.5}{70 \cdot 70.3} = 0.266 \text{ cm (las di badan)}$$

$$a_{effmax} := 1.41 \cdot \frac{3700 \cdot 0.7}{70 \cdot 70.3} = 0.742 \text{ cm (las di daun)}$$

maka dipakai  $a = 4 \text{ mm} > a_{perlu} = 0.127 \text{ mm}$

- **Kontrol Pelat Sambung**

Pelat penyambung BJ 37

Direncanakan baut BJ 37

$$f_u := 3700 \text{ kg/cm}^2$$

$$f_{ub} := 3700 \text{ kg/cm}^2$$

$$f_y := 2400 \text{ kg/cm}^2$$

$$d_b := 1.6 \text{ cm}$$

$$t_p := 1 \text{ cm}$$

$$A_b := \frac{\pi}{4} \cdot 1.6^2 = 2.011 \text{ cm}^2$$

**Luas bidang geser**

$$L := 15 \text{ cm}$$

$$A_{nv} := (L - 2 \cdot d_b) \cdot t_p = 11.8 \text{ cm}^2$$

**Kuat Rencana**

$$\Phi P_n := 0.75 \cdot (0.6 \cdot f_u \cdot A_{nv}) = 19647 \text{ kg} \quad \blacksquare > \blacksquare \quad P_u = 748.25 \text{ kg}$$